7 February 1965

DEVELOPMENT OBJECTIVES

SPECIAL HIGH-SPEED, STOP-MOTION PROJECTOR

1. Introduction

A special 35mm, high-performance projector capable of stop-motion, continuously variable speeds from 1 to 200 frames per second is needed for a series of studies designed to determine the capability of the human visual system to integrate similar images.

2. Background

As well as can be surveyed, there are no high-performance projectors already in existence which meet our specifications and which are readily available for procurement. Consequently, two alternatives present themselves: 1) modification of a suitable projector already on the market, or 2) design of a specially built model. The former alternative is more appealing since, for its immediate use, the projector will provide only a means to an end for another project.

3. Concept

For purposes of testing the human visual system's capacity for integrating multiple images, we require a projector of exceptionally high precision and reliability -- a precision which can be relied upon to the extent that it can be used as a factor in the statistical calculations of observers' responses to the projector's visual presentation. Precision, in fact, must attain to levels exceeding -- for the full range of speeds -- known sensitivities of the eye to errors in registration, distortion and, at lower speeds, the division of the duty cycle.

4. General Description

The equipment should be capable of variable speeds from 1-200 f/sec. and should be designed to handle 35 mm film. It should translate film by a stepping mode as opposed to a rotating prism system.

4. Requirements

The following specifications make the projector unconventional, but the other features which are not discussed here can be assumed to be conventional.

5.1 Variable Speeds. 1-200 frames per second. Must not damage film at any speed.

5.2 Film Handling. 35 mm film is to be used. The projector should also be designed to handle film loops which will be about 2-3' in length.

5.3 Stop Motion. Must not "wipe on" the image as prism mechanisms do, but must employ a shutter while translating frames.

5.4 Registration. Because of subliminal effects which would interfere with testing techniques, registration of projected images must be precise to the extent that errors are not detectable by the human eye. This implies a deviation in registration certainly less than one minute of arc (1), and an accuracy to one-tenth of a minute of arc (1/10) is a definite design goal.

5.5 Duty Cycle. 75% viewing: 25% actual translation movement. (An higher cycle ratio is attractive but is perhaps not reasonable.)

5.6 Distortion. Distortion with regard to discrepancy in distance measurements on identical projected images should be held below the level of human perception. Specified equivalently, that number would probably be less than one-tenth of 1% deviation.

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NPIC PROJECT NO. AM '65

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CLASSIFICATION

RECEIPT OCB/OS

DISSEMINATED OCB/OS

SUPPORT/SERVICE REQUIREMENT

(The following info is required when rqmts are levied by external organizations)

OFFICE_____ DATE OF RQMT_____ CONTROL NO._____

NPIC DIV/DETACH PROCESSING RQMT_____ PROJ OFF_____ PHONE_____

SUPPORT REQUESTED OF_____ PRIORITY_____ DATE REQUIRED_____

(The following info is required when rqmts are levied for internal support)

DIV/STAFF P&DS DATE OF RQMT 9 FEB '65 CONTROL NO._____

SUPPORT REQUESTED OF P&DS PROJ OFF [redacted] PHONE 2610 25X1A

PRIORITY_____ DATE REQUIRED 31 July 1966

1. BACKGROUND INFORMATION:

The work requested is in support of a departmental: ☐ Photo interpretation proj.; ☐ Non-photo interpretation project. It will result in: ☐ Hard copy report; ☐ Informal report (memo); ☒ Basic service only.

Project Description: High Speed Stop Motion Projector

2. SPECIFIC SUPPORT/SERVICE REQUESTED: Support from NPIC will probably consist of: ☐ Photographic; ☐ Reproduction; ☐ Mensuration; ☐ Graphics; ☐ ADP; ☐ Editing; ☒ Other (explain below) -- (Include statement as to estimated amount of work required of support component(s); i.e., number of contact prints, enlargements, boards, etc.)

The development of a special, continuously variable frame speed, stop motion projector for use in human visual integration studies.

3. URGENCY JUSTIFICATION: (If immediate support is required a statement of justification must be made on this form.)

DATE OF COMPLETION

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CLASSIFICATION

NPIC FM 218 (4-64)

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